

A REVIEW OF THE WORLD SPECIES OF *NOTOGLYPTUS MASI*
(HYMENOPTERA: PTEROMALIDAE)

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Abstract.—Until the present review, *Notoglyptus Masi* was a monotypic genus containing the single species *N. virescens* Masi, which was known from throughout the Old World. This species is redescribed, and its known distribution is extended to the Nearctic region. Four new species of *Notoglyptus* from the New World are described: *N. bidentatus*, *N. luteicrus*, *N. nesiotus* and *N. tzeltales*. *Notoglyptus* is redescribed, its relationships to other genera of the Miscogasterinae are discussed, and a key is given for distinguishing the known world species. The host(s) of species in this genus are still unknown.

Key Words: Hymenoptera, Pteromalidae, *Notoglyptus*, Nearctic, Palearctic, Neotropics, taxonomy

Masi (1917) described the genus *Notoglyptus* and included two species, *N. virescens* Masi from the Seychelles Islands, and *N. niger* Masi from Italy. He designated the latter species as the type-species of the genus. Boucek (1976) synonymized *N. niger* with *N. virescens*. This cosmopolitan species was by then known to occur throughout southern Europe, across to India, and down into southern Africa (Graham 1969, Boucek 1976). I have seen specimens from Japan and a single male from North America. During the course of sorting collections for a continuing study of the Nearctic miscogasterine Pteromalidae, I came across specimens belonging to four undescribed species of *Notoglyptus* from the New World—*N. bidentatus* n. sp. from South America, *N. tzeltales* n. sp. from Central America and northern South America, *N. luteicrus* n. sp. from the continental Nearctic region south to Venezuela, and *N. nesiotus* n. sp. from the Caribbean and coastal southeastern U.S.

Graham (1969) placed *Notoglyptus* in the Sphegigasterini (Miscogasterinae), probably

because the elongate T1 is found in other genera he placed there such as *Cryptoprymna* Förster and *Novitzkyanus* Boucek. Genera with an elongate T1 occur sporadically throughout the Pteromalidae, and I feel its common occurrence in these three genera is due to convergence (Heydon 1988). The closest relatives of *Notoglyptus* are among genera related to *Halticoptera* Spinola and *Thinodytes* Graham. These genera all share a similar unique propodeal structure—the median panels of the propodeum are reticulately sculptured or smooth and have a distinct median carina and plicae connected posteriorly by a W-shaped carina (compare Figs. 12 and 13). This carina is most distinctly developed in *N. bidentatus* and *N. tzeltales*, the most morphologically generalized *Notoglyptus* species. The terminal two segments of the maxillary palps of male *Halticoptera* are lamellately expanded, and this character state also occurs in *Notoglyptus luteicrus* (Fig. 11). However, using this character state as direct evidence for a close relationship between *Halticop-*

tera and *Notoglyptus* is complicated because *N. luteicrus* is one of the more morphologically derived members of the genus; this character state is not present in the more primitive extant species of *Notoglyptus*.

The characters defining *Notoglyptus* are reviewed in the Discussion section following the generic description below. *Notoglyptus* may have evolved in South America since that is where the most primitive species (*N. bidentatus* and *N. tzeltales*) are found.

MATERIALS AND METHODS

This study is based on examination of 67 specimens from the museums whose acronyms are given in the Acknowledgment section below. Type depositions are given in parentheses in the appropriate section under each species description. Terminology in this paper generally follows that of Graham (1969), except that club is used instead of clava and the gastral terga are numbered 1–7 starting with the basal tergite of the gaster. The following abbreviations are used: the multiporous plate sensillae are MPP sensillae, the lower ocular line is LOcL, the antennal funicular segments are F1, F2, . . . , F6, and the gastral terga are T1, T2, . . . , T7. The units of measurement given in the descriptions can be converted to millimeters by multiplying by 0.02.

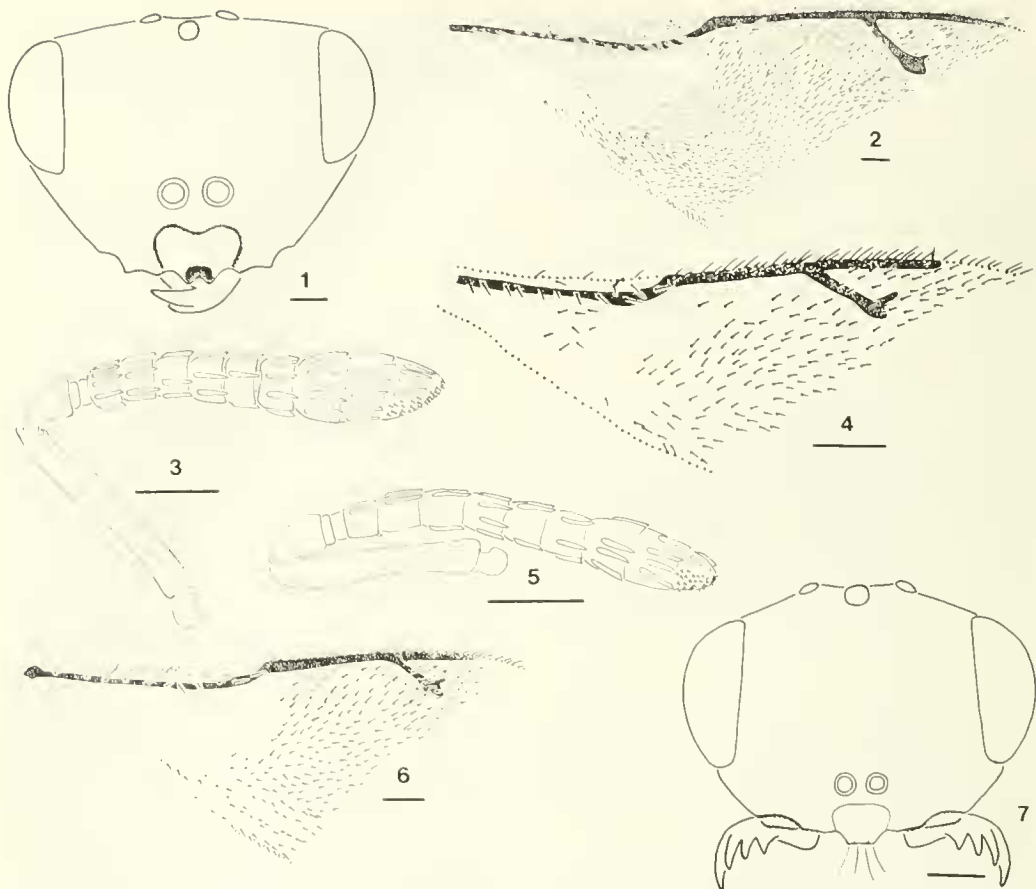
Notoglyptus Masi

Notoglyptus Masi, 1917: 181. Type species *N. niger* Masi (original designation). Gahan and Fagan, 1923: 98. Peck, Boucek, and Hoffer, 1964: 36 (key). Graham, 1969: 124 (key), p. 140. Boucek, 1976: 15. Dzhankmen, 1978: 77 (key), p. 80. Farooqi and Subba Rao, 1985: 259, 310F, 310G; 1986: 295.

Description. Color: Body ranges from black to metallic green or blue; legs metallic or entirely nonmetallic. Structure: Head ovate (Fig. 7) or triangular (Fig. 1) in anterior view; clypeus with anterior margin straight or produced (Fig. 7), bidentate in

N. bidentatus (Fig. 1); genal concavities well developed, extending $\frac{1}{2}$ to $\frac{1}{3}$ malar length. Antenna inserted near or below LOcL; with 2 anelli, 6 funicular segments, and 3-segmented club; MPP sensillae in 1 row on each funicular segment (Figs. 3, 5); club often with micropilosity on terminal segment(s) (Figs. 3, 5), apical spine not present. Mesosoma with pronotum reduced, much narrower and depressed relative to mesoscutum (Figs. 8, 10, 12), horizontal collar developed in *N. bidentatus* (Fig. 8), *N. tzeltales*, and *N. virescens* but not present in *N. luteicrus* (Fig. 10) and *N. nesiotus* (Fig. 12), this collar bordered anteriorly by weak to strong anterior transverse carina; mesoscutum with notauli complete, groovelike (Figs. 8, 10, 12); upper epimeron smooth; scutellum with scutosecutellar sulcus foveolate medially in *N. nesiotus* (Fig. 12) and *N. virescens*, frenal sulcus distinct (Figs. 8, 10, 12), frenum weakly coriaceous or smooth; propodeum with median panels alveolate or smooth, plicae and median carina distinct, connected posteriorly by W-shaped carina (Fig. 9). Wing hyaline; relative lengths of veins as submarginal > marginal > postmarginal > stigmal; basal cell and vein setate (Figs. 2, 4) except in *N. tzeltales* (Fig. 6); fore wing sometimes with distinct admarginal setae. Petiole quadrate to elongate, granulate to alveolate; median carina sometimes present; basal flange present. Gaster ovate; T1 nearly concealing succeeding terga, hind margin straight; hypopygium extending nearly to tip of gaster. Male maxillary palps pale in all species except *N. bidentatus*; terminal two segments lamellately expanded in *N. luteicrus* (Fig. 11).

Discussion. The following combination of character states will reliably distinguish *Notoglyptus*: the presence of distinct genal concavities; a 13-segmented antenna; complete, groovelike notauli (Figs. 8, 10, 12); the propodeum with the median carina and plicae distinct, and connected posteriorly by W-shaped carina (Fig. 9); the petiole about as long as wide, with a basal ventral flange;

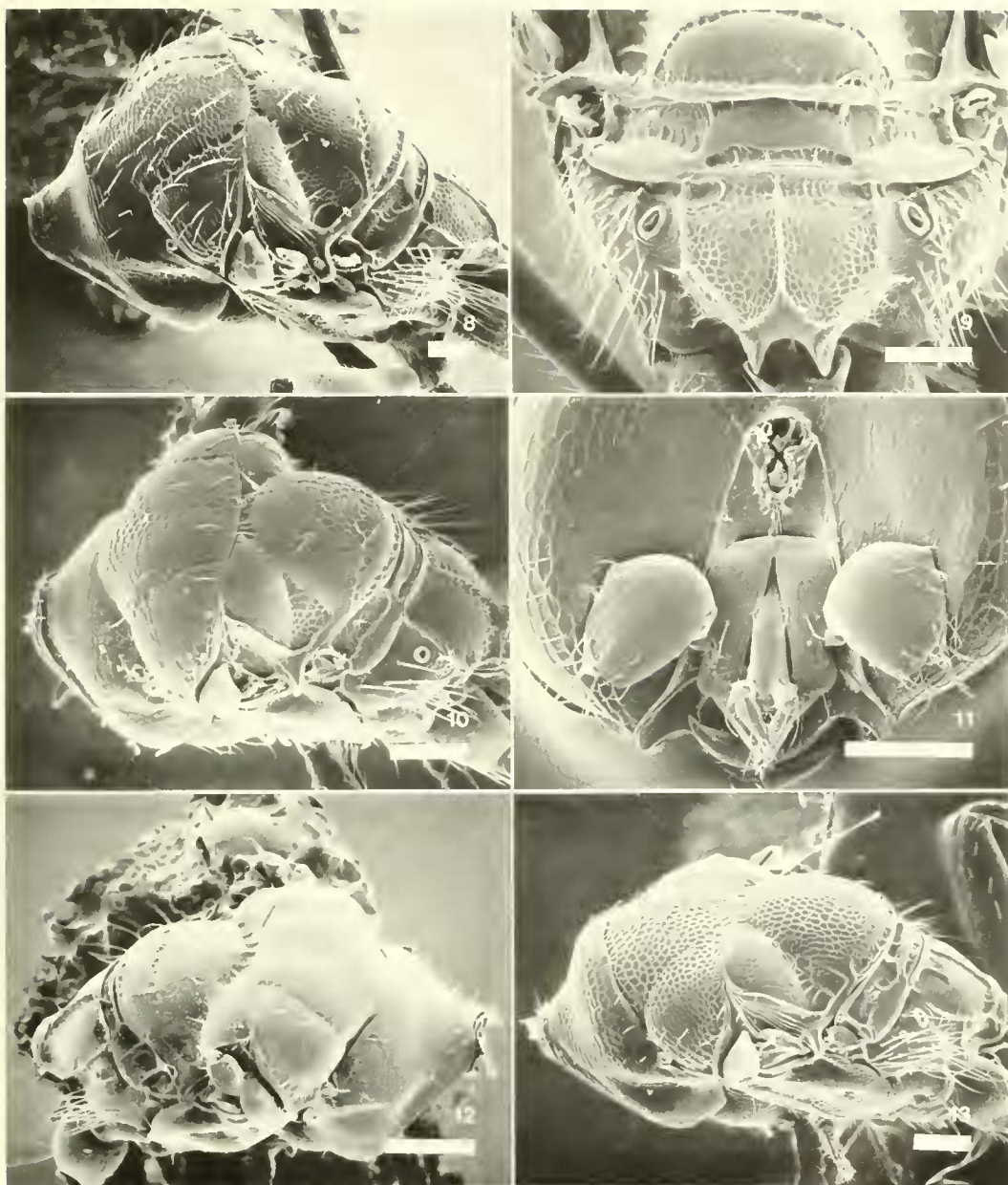


Figs. 1-7. 1-2, *Notoglyptus bidentatus* n. sp., male. 1, Anterior view of head. 2, Fore wing. 3, *Notoglyptus luteicrus* n. sp., female. 3, Antenna. 4-5, *Notoglyptus nesiotes* n. sp., female. 4, Fore wing. 5, Antenna. 6-7, *Notoglyptus tzeltales* n. sp., female. 6, Fore wing. 7, Anterior view of head.

T1 almost completely covering the entire length of gaster, with its hind margin entire; and the hypopygium extending to the tip of the gaster. An autapomorphy defining *Notoglyptus* is the reduction in size of the pronotum relative to the rest of the mesosoma. This character is easily seen in comparison with other closely related misogasterine genera such as *Halticoptera* (compare Figs. 8, 10, 12 with 13). The unique fovea in the center of the scutellum so prominent in the type species is clearly of no more than specific value when looking at this genus on a worldwide basis.

The species of *Notoglyptus* can be divided into two distinct species-groups. *Notoglyp-*

tus bidentatus and *N. tzeltales* comprise the first group which is characterized by a large body size, the body and legs with extensive bright metallic coloration, the anterior margin of the clypeus produced (Figs. 1, 7), the toruli located below the LOcL (Figs. 1, 7), the female antennal club with no micropilosity, the fore wing lacking any distinct admarginal setae, and the petiole without a median carina. Except possibly for the low insertion of the antennae, these character states are all plesiomorphic compared with those defining the other species-group. *Notoglyptus luteicrus*, *N. nesiotes*, and *N. virescens* form the second species-group. These species are relatively small, have the



Figs. 8–13. 8–9, *Notoglyptus bidentatus* n. sp., male. 8, Dorsolateral view of mesosoma. 9, Frenum, dorsellum, and propodeum. 10–11, *Notoglyptus luteicrus* n. sp., male. 10, Dorsolateral view of mesosoma. 11, Maxillary palps. 12, *Notoglyptus nesiotus* n. sp., female. 12, Dorsolateral view of mesosoma. 13, *Halticoptera* sp., female. 13, Dorsolateral view of mesosoma. Scale bar = 0.1 mm.

body color very dark, the legs (including the coxae) yellow and nonmetallic, the anterior margin of the clypeus nearly straight, the toruli located above the LOCL, the female

antennal club with micropilosity, the fore wing with distinct admarginal setae, and the petiole with a median carina.

Despite these obvious morphological dif-

ferences, the species I have placed together in *Notoglyptus* belong together as a monophyletic unit within the Miscogasterinae on the basis on the reduced size of the pronotum, and with respect to closely related genera such as *Halticoptera*, because of the elongate first gastral tergite and hypopygium. Division of the two species-groups into separate genera would result in the species-group containing *Notoglyptus bidentatus* and *N. tzetiales* being paraphyletic. Further, the important character of the presence or absence of the horizontal pronotal collar cuts across the species-groups as I have outlined them here. *Notoglyptus virescens* has a horizontal collar as do *N. bidentatus* and *N. tzetiales*; yet, in the characters separating the species-groups, *N. nigrescens* belongs with *N. luteicrus* and *N. nesiotus*.

KEY TO WORLD SPECIES OF
NOTOGLYPTUS MASI

1. Pronotum lacking horizontal collar, sloping downward immediately from anterior margin of mesoscutum (Figs. 10, 12) 2.
- Pronotum with short horizontal collar separated from declivitous neck by a weak to strongly developed transverse carina (Fig. 8) 3.
2. Scutellum with a pair of diverging foveae at base (Fig. 12). Dorsellum cariniform. Female antenna with funicular segments 5-6 quadrate to elongate (Fig. 5). (West Indies and coastal southeastern United States) *nesiotus* Heydon
- Scutellum with scutoscutellar sulcus a continuous deep furrow, not foveolate (Fig. 10). Dorsellum bandlike, length nearly half that of frenum. Female antenna with funicular segments 5-6 transverse (Fig. 3). (Continental North America south to Venezuela) *luteicrus* Heydon
3. Scutellum with discal fovea. Torulus above lower ocular line. Coxae and femora yellow, nonmetallic *virescens* Masi
- Scutellum smoothly convex (Fig. 8). Torulus below lower ocular line (Figs. 1, 7). Coxae and femora blue or green, metallic. (Neotropical) 4.
4. Head triangular in anterior view; anterior margin of clypeus bidentate (Fig. 1). Basal cell of fore wing setate (Fig. 2). Body length 2 mm or more. (South America) *bidentatus* Heydon
- Head ovate in anterior view; anterior margin of clypeus truncate (Fig. 7). Basal cell of fore wing bare (Fig. 6). Body length 1.8 mm or less. (Central America and northern South America) *tzetiales* Heydon

Notoglyptus bidentatus,
NEW SPECIES
Figs. 1-2, 8-9

Holotype, female. Description. Color: Head dark green; mesosoma mostly dark green with strong coppery reflections on dorsum and upper epimeron; pronotum, propodeum, petiole, gaster bluish black. Antenna with scape, pedicel dark green; flagellum black. Maxillary palp brown. Legs with coxae dark blue; fore, middle trochanters orange-yellow, hind trochanter brown; femora blue-green, orange-yellow basally and apically; tibiae orange-yellow basally, remainder orange-brown with weak metallic reflections medially; tarsi dark brown. Wing veins brown.

Sculpture: Clypeus, gena finely coriaceous; head finely alveolate otherwise. Mesosoma (Fig. 8) with middle lobe of mesoscutum alveolate; side lobes, scutellum, frenum (weakly) finely coriaceous; dorsellum smooth; median panels of propodeum alveolate (Fig. 8); petiole finely alveolate, alveoli $2\times$ as long as wide; gastral terga smooth.

Structure: Body length 2.4 mm. Head (Fig. 1) triangular in anterior view, width $1.4\times$ height (46:34), $2.2\times$ length (46:21); clypeus separated from face by deep furrowlike carina, anterior margin produced and bidentate; genal concavity shallow, extending $\frac{1}{3}$ malar distance; frons regularly concave between eyes; eye height $1.4\times$ length (16.5:12.0), $1.1\times$ malar length (16.5:15.0), eye length $1.5\times$ temple length (12:8); ratio of MOD, OOL, POL, LOL as 3:11:8:4. Antenna with torulus one inside diameter beneath LOeL; combined length of pedicel and flagellum $0.85\times$ head width (39:46); relative lengths of scape, pedicel, anelli, F1-6, club as 22.0:7.0:3.0:4.0:4.5:4.0:4.0:3.5:7.0; widths of F1, F6, club as 3:5:5; second anellus $2\times$ as large as first; club without micropilosity. Mesosoma (Fig. 8) length $1.6\times$ width (59:36); collar with weak anterior transverse carina; scutellum regularly rounded, scutoscutellar sulcus continuous

furrow; dorsellum bandlike, length equal to frenal length; spiracles ovate, $< 1 \times$ own diameter from anterior margin of propodeum; nucha bordered by carina anteriorly. Fore wing (Fig. 2) length $2.3 \times$ width (145:63); ratio of submarginal, marginal, postmarginal, stigmal vein lengths as 50.0:30.0:24.0:13.5; costal cell densely setate; basal cell setate to base along anterior margin; speculum closed posteriorly; no distinct admarginal setae present. Petiole broadening apically, length $1.8 \times$ apical width (15.0:8.5); lacking median carina. Gaster length $1.4 \times$ width (42:30); deep, height $1 \times$ width (30:30).

Allotype, male. Color: Similar to holotype female except front of head blue-green with violet reflections, anelli and funicular segments tan ventrally. Structure: Body length 2.4 mm. Antenna with combined length of pedicel and flagellum $0.93 \times$ head width (40:43); lengths of scape, pedicel, anelli, F1-6, club as 20:5:3:4:4:4:4:4:9; widths of F1, F6, club as 3.5:4.0:4.0; funicular segments tend to be hemispherical. Maxillary palps slender. Petiole length $2.2 \times$ width (15.5:7.0). Gaster length $1.3 \times$ width (37:28).

Variation. The body length of the paratype males ranges between 2.1 and 2.8 mm. Though all the paratype males were collected from approximately the same area, they show considerable variation in color. Most are basically green like the allotype, but one is blue, and several of the others have greater or smaller areas of the head and mesosoma purple. One male has a petiole only 1.4 times as long as wide; the petiole of the other males ranges between 1.8 and $2.3 \times$ as long as wide. The basal cell varies from totally setate, as in the holotype, to two specimens which have only a couple of rows of setae along the anterior margin of the basal cell.

Discussion. Unique features of this species are the triangular head (Fig. 1), the broad and deep antennal scrobes, the long malar distance, the bidentate clypeus (Fig. 1), the

deep sulcus around the clypeus (Fig. 1), and the dark maxillary palps. *Notoglyptus bidentatus* exhibits a few primitive character states not found in congeners. It has a distinct pronotal collar (Fig. 8) (a character state shared with *N. tzeltales* and *N. virescens*), a bidentate clypeus, and dark maxillary palps. The extensively setate wings (Fig. 2) may also be primitive. However, setate wings are common in miscogasterine species living at high elevations or latitudes, so it is difficult to say in this case whether the setate wings of *N. bidentatus* are primitive or an adaptation to the mountainous habitats where this species occurs.

Etymology. The specific name is from the Latin word *bidentatus*, meaning two-toothed, and refers to the unique bidentate state of the anterior margin of the clypeus in this species.

Biology. Nothing is known of the host(s) of this species.

Type material. The holotype, allotype, and 5 male paratypes (all CNC) were collected in Ecuador in the elfin forest at 3800 meters along the Quito-Baeza Road on 1 March 1979 by W. Mason. Four additional paratypes (CNC, INHS, USNM) were collected as follows: Ecuador, Napo (4100 m, Quito-Baeza Road), 24-II-1983, 1 ♂, Paruma (4200 m, Quito-Baeza Road), 14-17-II-1982, 3 ♂.

Notoglyptus luteicrus,

NEW SPECIES

Figs. 3, 10-11

Holotype, female. Description. Color: Head, mesosoma, petiole black, except the following blue: clypeus; pairs of diffuse spots extending anteriorly from lateral ocelli; vertex along orbits; lateral parts of pronotum and mesoscutum, frenum, dorsellum, propodeum; pleural regions posteriodorsally. Gaster brown, T1 with bluish reflections. Antenna with scape yellow-brown, darker in apical $\frac{1}{2}$; pedicel brown; flagellum dark brown. Mandibles yellow, teeth reddish yellow. Maxillary palps yellow. Legs yellow, pretarsi dark brown. Wing veins pale brown.

Sculpture: Clypeus smooth; remainder of head, mesoscutum (Fig. 10), scutellum delicately alveolate; frenum coriaceous (Fig. 10); dorsellum smooth; median panels of propodeum alveolate, pattern very weak in center of each panel; petiole granulate; gastral terga smooth.

Structure: Body length 1.4 mm. Head ovate in anterior view, width $1.3 \times$ height (27:21), $2.2 \times$ length (27:12); clypeus set off from face by obscure sulcus, anterior margin straight; genal concavity extending half-way to eye; antennal scrobes shallow; eye height $2.4 \times$ length (13.0:5.5), $2.2 \times$ malar length (13:6), length $4.9 \times$ temple length (9.5:2.0); ratio of MOD, OOL, POL, LOL as 1.5:5:6.5:3. Antenna (Fig. 3) with torulus one outside diameter above LOcL; combined length of pedicel and flagellum $0.93 \times$ head width (25:27); relative lengths of scape, pedicel, anelli, F1-6, club as 13.0:4.0:1.0:2.0:2.5:2.0:2.0:2.0:1.5:8.0; widths of F1, F6, club as 2.0:3.5:4.0; anelli subequal in size; micropilosity completely covering ventral side of terminal segment. Mesosoma length $1.4 \times$ width (28:20); collar undeveloped; scutellum regularly rounded, scutoscuteellar sulcus continuous furrow; dorsellum length $\frac{1}{2}$ frenal length; spiracles round, $1 \times$ own diameter from anterior margin of propodeum; nucha acarinate anteriorly. Fore wing length $3.1 \times$ width (65:21); ratio of submarginal, marginal, postmarginal, stigmal vein lengths as 20:11:9:6; costal cell with single complete row of setae; basal vein with row of 4 setae; basal cell with 1 seta on left wing; speculum open posteriorly; 1 row of distinct admarginal setae present. Petiole length $1.1 \times$ width (4.5:4.0); median carina present. Gaster ovate, length $1.4 \times$ width (29:21); height $0.86 \times$ width (18:21).

Allotype, male. Description. Color: Similar to holotype except reflections of frenum, dorsellum, propodeum green. Structure: body length 1.4 mm. Antenna with combined length of pedicel and flagellum $1.2 \times$ head width (31.0:26.5); relative lengths of scape, pedicel, anelli, F1-6, club as 14:3:1:

3:3:3:3:3:9; widths of F1, F6, club as 2:3:3. Maxillary palps (Fig. 11) with 2 apical segments lamellately expanded. Petiole length $1.2 \times$ width (6:5). Gaster length $1.4 \times$ width (22:16).

Variation. Body size in the females ranges from 1.0 to 1.5 mm; in the males, 1.2 to 1.4 mm. The patches of metallic coloration on the head and mesosoma vary among specimens in extent, intensity, and color. The color varies from blue, as in the holotype, to dark green. The specimens from the eastern U.S. and Canada usually have the scape brown only at the apex, but those from Mexico and the western U.S. and Canada have the scape mostly brown. The setal patterns of the wings are variable, but the wings generally resemble that in Fig. 4.

Discussion. The unique feature of this species is the lamellately expanded male maxillary palps (Fig. 11). Within its species-group, *Notoglyptus luteicrus* resembles *N. nesiotus* in lacking any horizontal collar on the pronotum (Fig. 10) and a patch of micropilosity on the apical segment of the female club (Fig. 3). *Notoglyptus luteicrus* has spots of metallic coloration located in similar places to those in *N. nesiotus* but the boundaries of the spots on the head are diffuse in *N. luteicrus* and sharp in *N. nesiotus*.

Etymology. The specific name comes from the Latin words *luteus*, meaning yellow, and *crus*, meaning leg, and refers to the yellow legs of this species.

Biology. Nothing is known of the host(s) of this species, but specimens have been collected from alfalfa, soybeans, *Baccharis* L. (Compositae), and the crucifers *Sisymbrium altissimum* L. and *Descurainia sophia* (L.) P. B. Webb.

Type material. The holotype (INHS) was collected from the railroad siding at the end of Gerty Drive on the South Farms of the University of Illinois, Champaign County, Illinois, on 25 June 1982, by S. L. Heydon. The allotype (INHS) came from the same locality, but was collected 21 August 1981. Eighteen additional paratypes were collect-

ed as follows (AMNH, CNC, INHS, SEC, USNM): Canada. ALBERTA: Lethbridge, 5·VII·1956, (swept from brome) 2 ♀; Lost River, Onefour (10 mi. WNW Wild Horse), 3·VI·1956, 1 ♀. ONTARIO: 13 mi. N Belleville, 27·V·1970, 1 ♀. United States. CALIFORNIA: Rancho Santa Fe, 14·I·1959, (alfalfa field) 1 ♀. COLORADO: Fort Collins, V·1894, (alfalfa) 1 ♂. FLORIDA: Collier Seminole State Park (Collier Co.), 25–26·V·1978, 1 ♀; Fort Ogden, 8·IV·1952, 1 ♀. IDAHO: Hansen, 29·V·1930, (*Sisymbrium altissimum* and *Descurainia sophia*) 1 ♀. INDIANA: Hovey Lake (Posey Co.), 3·VI·1981, 1 ♂. ILLINOIS: Dixon Springs Agricultural Research Station (Pope Co.), 29–31·VII·1980, 1 ♂. LOUISIANA: Cameron Parish, 4·VIII·1969, (soybeans) 1 ♀. MARYLAND: Patuxent Research Center (Prince Georges Co.), 1·VIII·1982, 1 ♀. NEW JERSEY: Ramsey, 31·VII·1918, 1 ♀. NEW MEXICO: Elmendorf, 21·VII·1936, 1 ♀. UTAH: Richfield, 18·V·1954, 1 ♀; Utah Lake (Utah Co.), 1 ♀. Mexico. VERACRUZ: Jalapa, III–IV·1965, 1 ♀. Venezuela. PORTUGUESA: 10 km N Biscucuy, 9·VI·1981 (sweeping *Baccharis*), 1 ♂. Country? San Rafael Jicoltepec, 1 ♀, 3 ♂.

Notoglyptus nesiotetes,

NEW SPECIES

Figs. 4–5, 12

Holotype, female. Description. Color: Head, mesosoma, petiole black except propodeum metallic coppery; inner orbit along vertex, area between median and lateral ocelli, pronotum and mesoscutum laterally, posteriodorsal pleural region metallic green. Gaster dark reddish brown with coppery reflections dorsally. Antenna with scape, anelli yellow; pedicel, flagellum brown. Mandibles yellow, teeth reddish yellow. Maxillary palps yellow. Legs yellow, pretarsi black. Wing veins yellow, parastigma darker.

Sculpture: Body sculpture weak, face coriaceous, mesoscutum (Fig. 12) weakly al-

veolate mesally, petiole granulate, body nearly smooth otherwise.

Structure: Body length 1.4 mm. Head ovate in anterior view, width $1.4 \times$ height (22:16), $2.2 \times$ length (22:10); clypeus separated from face by obscure sulcus, anterior margin straight; antennal scrobes shallow; genal concavity weakly developed, extending only $\frac{1}{3}$ of way to eye; eye height $1.2 \times$ length (9.0:7.5), $2.0 \times$ malar length (9.0:4.5), eye length $3.8 \times$ temple length (7.5:2.0); ratio of MOD, OOL, POL, LOL as 1.5:5:5.5:3. Antenna (Fig. 5) with torulus $1 \times$ own outside diameter above LOCL; combined length of flagellum and pedicel $1.0 \times$ head width (23:22); relative lengths of scape, pedicel, anelli, F1–6, club as 10.5:3.5:1.0:2.0:2.0:2.0:2.0:2.5:2.0:6.0; widths of F1, F6, club as 1.5:2.0:2.0; anelli subequal in size; club with patch of micropilosity down ventral side of apical segment. Mesosoma (Fig. 12) length $1.7 \times$ width (26:15); collar not developed; scutellum uniformly convex, scutoscuteellar sulcus with pair of contiguous diverging foveae mesally; dorsellum carinalike; spiracles $1.5 \times$ own diameter from anterior margin of propodeum, nucha bordered by carina anteriorly. Fore wing (Fig. 4) length $2.7 \times$ width (48:18); submarginal, marginal, postmarginal, stigmal vein lengths as 17.0:11.5:7.0:5.0; costal cell with one complete row of setae plus a few others distally; basal vein setate; speculum open posteriorly; distinct row of admarginal setae present. Petiole length $0.88 \times$ width (3.5:4.0); median carina present. Gaster ovate, length $1.4 \times$ width (25:18); height $1.0 \times$ width (18:18); T2–7 protruding from beneath T1.

Male unknown.

Variation. The specimens in the type series from Isla Mona are all of a rather uniform size, coloration, and morphology. The number of setae along the basal vein varies from just a couple of setae to a row extending down the length of the basal cell and curving basally down the cubital vein. About half the specimens have a few setae distally

in the basal cell. The paratype female from Sapelo Island, Georgia, lacks the metallic patches on the head and is more distinctly sculptured than the series from Isla Mona. Its body sculpturing resembles that given above for *N. luteicrus*. It also resembles *N. luteicrus* in lacking the distinct carina along the anterior margin of the nucha. However, it has long terminal funicular segments of the antenna, a foveolate scutoscutellar sulcus (Fig. 12), and a cariniform dorsellum, features which are all diagnostic for *N. luteicrus*. Collection of specimens from a wider geographic range may help make sense of the morphological divergence between the populations from Puerto Rico and those of the continental U.S.

Discussion. Unique features of this species are the weak body sculpture (Fig. 12) and the cariniform dorsellum (Fig. 12). *Notoglyptus nesiotus* and *N. virescens* both have terminal funicular segments of the antenna quadrate or elongate and a foveolate scutoscutellar sulcus, but *N. nesiotus* lacks the fovea on the disc of the scutellum characteristic of *N. virescens*.

Etymology. The species name is derived from the Greek word *nesiotus*, meaning insular, and refers to the island distribution of this species.

Biology. The host(s) of this species are unknown. The paratype female from Sapelo Island, Georgia, was collected on *Spartina* Schreber (Gramineae).

Type material. Holotype (USNM) and 8 paratype females (CNC, USNM) were collected on Isla Mona, Puerto Rico, in August 1944, by H. A. Beatty. One additional paratype female was collected as follows: United States. GEORGIA: Sapelo Island (Mcintosh Co.), 10-IX-1963 (on *Spartina*).

Notoglyptus tzeltales,

NEW SPECIES

Figs. 6-7

Holotype, female. Description. Color: Front of head dull dark green; vertex, dorsum of mesosoma blue-green; propodeum,

pleural regions, coxae green; petiole bluish black; gaster dark reddish brown with strong bluish reflections. Antenna with scape blue-green; remainder brown, pedicel with weak metallic reflections. Mandibles brownish yellow; teeth pale brownish red. Maxillary palps cream-colored. Legs with most of femora brown with weak metallic reflections; tibiae brownish yellow, slightly darker mesally; basal tarsal segment brownish yellow, rest of tarsi darkening distally till pretarsus black. Wing veins reddish brown.

Sculpture: Clypeus granulate; head, mesosoma, scutellum regularly alveolate; frenum, dorsellum, propodeum smooth; petiole finely strigulate dorsally; gaster smooth.

Structure: Body length 1.6 mm. Head (Fig. 7) broadly ovate in anterior view, width $1.3 \times$ height (32:24), $2.1 \times$ length (32:15); clypeus separated from face by distinct sulcus, anterior margin produced but truncate; antennal scrobes shallow; genal concavity extending $\frac{1}{2}$ way to eye; eye height $1.3 \times$ length (14:11), $1.8 \times$ malar length (14:8), length $3.7 \times$ temple length (11:3); ratio of MOD, OOL, POL, LOL as 2.5:6:6:3. Antenna with torulus located just below LOeL; combined length of pedicel and flagellum $0.72 \times$ head width (23:32); relative lengths of scape, pedicel, anelli, F1-6, club as 14.0:4.5:1.5:2.0:2.0:2.0:2.0:2.0:5.0; relative widths of F1, F6, club as 2.0:3.0:3.5, all funicular segments except F1 transverse; anelli subequal in size; club lacking ventral patch of micropilosity. Mesosoma length $1.4 \times$ width (34:24); collar developed, anterior edge rounded; scutellum regularly convex, scutoscutellar sulcus continuous furrow; dorsellum length about $\frac{1}{2}$ frenal length; spiracles ovate, $< 1 \times$ own diameter from anterior margin of propodeum; carina bordering nucha anteriorly. Fore wing (Fig. 6) length $2.2 \times$ width (71:33); ratio of submarginal, marginal, postmarginal, stigmal vein lengths as 28:18:8.5:6; costal cell with one complete row of setae and couple of others distally; basal cell and vein bare;

speculum open posteriorly; no distinct admarginal setae. Petiole length $1.6 \times$ width (8:5); lacking median carina. Gaster ovate, length $1.7 \times$ width (30:18); deep, height $1 \times$ maximum width (18:18).

Allotype, male. Color: Pattern similar to holotype but antenna beyond basal half of pedicel nonmetallic, brownish yellow; club slightly darker on outer side. Body length 1.5 mm (critical point-dried). Antenna with combined length of pedicel and flagellum $0.73 \times$ head width (20.5:28.0); relative lengths of scape, pedicel, anelli, F1–6, club as 12:3:1:2:2:2:2:2:5; relative widths of F1, F6, club as 2:3:3; funicular segments cylindrical. Maxillary palps slender. Petiole length $2.0 \times$ width. Gaster length $1.6 \times$ width (31:20).

Variation. The color of *N. tzeltales* varies greatly over its geographic range. The female from Huetamo de Nuñez is almost black except for the dorsum of the mesosoma which is dark green, and the antennal flagellum is yellow beyond the basal half of the pedicel. The male has the face violet, the remainder of the head and mesosoma green, the pedicel to F6 yellow, and the club brown. Females of the series from Venezuela have the body greenish black and the antennal flagellum brown. In the males, one paratype has antennal coloration like that of the allotype, while the other has the flagellum brown on the outer face and pale on the inner face. The males from Venezuela also have the tip of the middle tibia darkened. The Venezuela series was collected into alcohol and then critical point-dried. This process can sometimes alter the colors of specimens. Whether the color differences in *N. tzeltales* are caused by environmental influences or genetic differences needs study.

Discussion. Unique features of *N. tzeltales* are the bare basal cell and vein (Fig. 6). This species most closely resembles *N. bidentatus* in having metallic legs and the anterior margin of the clypeus produced; although in *N. tzeltales* (Fig. 7), the clypeus does not have the median emargination

present in *N. bidentatus* (Fig. 1). The two species are reliably distinguished by the characters given in the key.

Etymology. The specific name of this species comes from the Tzeltales Indians who live in the area of Mexico around San Cristóbal de las Casas.

Biology. The host(s) of this species is unknown.

Type material. The holotype (CNC) is from San Cristóbal de las Casas, Mexico, and was collected 1–3 June 1969. The allotype male and 8 female and 2 male paratypes (USNM) were collected in Venezuela, 10 km north of Biscucuy, on 9 June 1981, by E. E. Grissell, while sweeping *Baccharis* (Compositae). Ten female and 1 male paratypes were collected as follows (CNC, USNM): Costa Rica. Cartago (1500 m), VIII·1980, 1 ♀; Heredia, 10·VIII·1975, 2 ♀. Mexico. CHIAPAS: San Cristóbal de las Casas, 27·IV·1969, 2 ♀, 12·VI·1969, 1 ♀. MICHOACAN: Huetamo de Nuñez, 7·III·1972, 1 ♀, 1 ♂. QUERETARO: 10 mi. E San Juan Del Río, 30·VII·1954, 2 ♀. Guatemala. GUATEMALA: Guatemala City, IX·1959, 1 ♀.

Notoglyptus virescens Masi

Notoglyptus virescens Masi, 1917: 181–183.

Gahan and Fagan, 1923: 98. Boucek, 1961: 67. Graham, 1969: 140. Boucek, 1976: 15 (synonymy). Boucek, Subba Rao, and Farooqi, 1978: 448. Farooqi and Subba Rao, 1986: 295. Holotype, ♀, BMNH Hym. 5.873 (examined).

Notoglyptus niger Masi, 1917: 181. Erdős, 1948: 38. Boucek, 1961: 67. Peck et al., 1964: 36. Boucek, 1976: 15 (synonymy). Farooqi and Menon, 1973: 55. Boucek, 1977: 46. Dzhankmen, 1978: 80. Boucek et al., 1978: 448.

The following description of *N. virescens* is based on a pair of specimens on loan to me from the BMNH.

Female. Description. Color: Head, mesosoma, petiole dark green; gaster brown. Antenna with scape yellow, slightly more brown

apically; remainder brown, pedicel pale ventrally. Mandible yellow, teeth reddish brown. Maxillary palps yellow. Legs yellow. Wing veins yellowish brown.

Sculpture: Clypeus smooth, remainder of head delicately alveolate; mesoscutum roughly alveolate medially, becoming coriaceous laterally; scutellum coriaceous; frenum, dorsellum smooth; median panels of propodeum alveolate, sculpturing weak in center of panels; petiole alveolate; gaster smooth.

Structure: Body length 1.3 mm. Head ovate in anterior view, width $1.3 \times$ height (23.5:18.0), $2.0 \times$ length (23.5:11.5); clypeus separated from face by obscure sulcus, anterior margin nearly straight, slightly reflexed; antennal scrobes shallow; genal concavity extending $\frac{1}{2}$ way to eye; eye height $1.4 \times$ length (11:8), $2.8 \times$ malar length (11:4), length $2.7 \times$ temple length (8:3); ratio of MOD, OOL, POL, LOL as 2.0:4.5:6.0:3.0. Antenna with torulus $1 \times$ own diameter above LOcL; combined length of pedicel and flagellum $1.1 \times$ head width (25.0:23.5); relative lengths of scape, pedicel, anelli, F1-6, club as 11.0:3.0:1.0:2.0:2.5:2.5:2.5:2.5:7.0; relative widths of F1, F6, club as 1.75:2.0:2.0; anelli subequal in size; micropilosity in line down ventral side of terminal two segments of club. Mesosoma length $1.5 \times$ width (28:19); horizontal collar developed, anterior edge carinate; scutellum with distinct discal fovea, scutoscuteellar sulcus foveolate medially; dorsellum length $\frac{1}{2}$ frenal length; propodeum with spiracles circular, $1.5 \times$ own diameter from anterior margin of propodeum; nucha not bordered by carina anteriorly. Fore wing length $2.5 \times$ width (57:23); ratio of submarginal, marginal, postmarginal, stigmal vein lengths as 20:12:9:5; costal cell with 1 complete setal row basally and a couple others apically; basal cell with apical quarter setate; speculum closed posteriorly; distinct admarginal setae present. Petiole length $1.2 \times$ width (5:4); with weak median carina. Gaster length $1.3 \times$ width (21:16); height $1.1 \times$ width (17:16).

Male. Color: Similar to female except face with face bluish, dorsum of mesosoma greenish. Structure: Body length 1.0 mm. Antenna with combined length of pedicel and flagellum $1.5 \times$ head width (31:21); relative lengths of scape, pedicel, anelli, F1-6, club as 10.0:2.5:1.0:3.0:3.0:3.0:3.0:3.5:3.0:8.0; relative widths of F1, F6, club as 2:2:2. Maxillary palps slender. Gaster length $1.5 \times$ width (27:18).

Variation. The male from Ontario is a little larger (body length 1.3 mm), its scape is mostly brown, its legs are more amber, and its petiole lacks the median carina; but agrees otherwise with the above description.

Discussion. Unique features possessed by this species are the fovea on the disc of the scutellum and the club having a line of micropilosity down the ventral side. This species is intermediate in morphology within the genus since it has the developed horizontal pronotal collar like *N. bidentatus* and *N. tzeltales*, but has the straight clypeal margin, the toruli located above the LOcL, the antennal club with micropilosity, yellow legs, admarginal setae, and a median carina on the petiole like *N. luteicrus* and *N. nesiotus*.

Distribution. This species is found from southern Europe to India, Japan, and southern Africa (Boucek 1976, 1977). There is a male in the Canadian National Collection from Mount Pakenham, Ontario.

Material Examined (BMNH, CNC). India. Delhi, 1MRI, 1·IV·1977, (on grass) 1 ♀. Zimbabwe. Salisbury, 1 ♂. Japan. KYOTO: Kibune, 6·VIII·1980, 1 ♀. Canada. ONTARIO: Mount Pakenham, 11·VI·1969, 1 ♂.

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